

SECONDARY SEXUAL DIMORPHISM IN *COTINIS NITIDA* L. (COLEOPTERA: SCARABAEIDAE)

By MICHAEL A. GOODRICH¹

In work on a revision of the genus *Cotinis* Burmeister I dissected the genitalia of many specimens of *C. nitida* and found several external sexual differences. A few earlier workers have commented on external differences of the sexes in *Cotinis*. Bates (1889) and others mention a broader, more robust figure for females and a more slender shape for males in several species. Casey (1915) states that "sexual modifications are few and feeble and reside in the dentition of the anterior tibiae, sometimes also in the longitudinal abdominal impression of the males and relative lengths of the hind tarsi." Nichol (1935) states that in *C. texana* Casey (a species I believe to be a synonym of *C. mutabilis* Gory & Percheron) the sexes can be easily distinguished by differences in the terminal abdominal segment. In females the ventral sclerite of the terminal abdominal segment is armed with bristles and is transversely sculptured, while in males the medial area of this sclerite is almost entirely smooth.

Neither Bates nor Casey made a careful systematic study of secondary sexual differences. In fact, neither author appears to have dissected any specimens to determine sex.

METHOD

Fifty specimens of *C. nitida* from several localities in the northeastern United States were dissected and examined for external sexual differences. Particular attention was directed toward the dentition of the anterior tibiae and the relative lengths of the hind tibiae and tarsi, the development of the clypeal horn, overall size and shape, and the sculpture and pubescence of the pygidium. Micrometer measurements of the relative lengths of hind tibiae and tarsi were made at 10X magnification with a Bausch & Lomb dissecting microscope.

In comparing the dentition of the anterior tibiae a code system was used. It was as follows: A—3 teeth, all well developed and equally spaced; B—3 teeth, the uppermost reduced and somewhat removed from the other two; C—2 teeth. D—dentition further reduced.

In such a ranking, specimens with worn down tibial teeth must be excluded. Such specimens occur regularly in collections and are easily recognized. Of course, all degrees of development were observed, and where a particular example could not be clearly placed in one of the categories, the designation A-B or B-C was used. Subsequently 12 specimens from San Antonio, Texas (the extreme southwestern range of the species) were examined for the same sexual differences seen in the northern population.

¹ Department of Zoology & Entomology, Pennsylvania State University, University Park, Pa.

The sexual difference in the pubescence of the last abdominal sternite described by Nichol (1935) for *C. texana* is also found in *C. nitida*. In *C. nitida* the median portion is almost smooth in males, and transversely sculptured and provided with yellow hairs in the female. This character, although distinct in a large series, is a relative difference and might prove difficult unless material already determined to sex is compared. Only these three characters were dependable in determining sex. The clypeal horn showed only a tendency of the distal end to be rounded in the female, more angulate in the male.

It has been suggested that females are larger and broader than males; however, this difference is so little as to be detectible only in large series of specimens. The difference in average size between series from various latitudes is far greater. Bates (1889) and Casey (1915) usually describe males of various species in *Cotinis* as narrower and tapering more sharply posteriorly than the females, but this character is at best deceptive and not at all constant.

The color pattern of *C. nitida* is highly variable, but these patterns are not correlated with sex.

The 12 specimens from San Antonio, Texas, had the same sexual dimorphism as in the eastern specimens.

I have attempted to determine if the secondary sexual characters of *C. nitida* occur in the other species in the genus. The sexual difference most applicable to the other species is the character of the terminal abdominal sternite described by Nichol (1935). However, some species do not show this difference, and in some species I have insufficient material to determine its applicability. The lengths of the hind tarsi and tibiae in the sexes appear to be similar, but accurate measurements of long series of each species would be required to prove this. Some reduction in the dentition of the anterior tibiae of the males is observed in other species.

LITERATURE CITED

- BATES, H. W.
1889. Pectinicornia and Lamellicornia. *Biologia Centrali-Americana*, Ins., Coleop. 1886-1890, 2(2):432 pp.
- CASEY, T. L.
1915. A review of the American species of Rutelinae, Dynastinae and Cetoniinae. *Mem. Coleop.* 6:1-394.
- NICHOL, A. A.
1935. A study of the fig beetle, *Cotinis texana* Casey. *Univ. Arizona Agric. Expt. Sta. Tech. Bull.* No. 55:157-198.



LITERATURE NOTICE

CONTRIBUTI ALLA CONOSCENZA DELLA ENTOMOFAUNA DELLA FERULA COMMUNIS L. III. TILLUS TRANSVERSALIS (CHARP.) (COLEOPTERA CLERIDAE), by Antonello Crovetto. *Studi Sassaresi (Sezione 3)* 9(2): 550-600, 23 figs, 1961.—More than half the pages are devoted to the biology of this beetle. The remainder concerns morphology of all stages and keys the larvae of the 3 Italian species of *Tillus*.